Volume : 4 | Issue : 10 | October 2015 • ISSN No 2277 - 8179

Research Paper

Chromobacterium Violaceum Causing Fournier's Gangrene: a Rare Presentation with Non-Fatal Outcome

Medical Science

KEYWORDS : Chromobacterium violaceum ; Fournier's Gangrene

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ABSTRACT

Infections with Chromobacterium violaceum are rare; however, they are frequently fatal. Fewer than 200 cases have been reported worldwide and a majority of them have been reported in children. Patients often have a rapidly deteriorating clinical course if not treated appropriately and quite often, relapses ensue. Commonly found as a saprophyte in soil and water, it is often regarded as a contaminant. Knowledge of this pathogen amongst the physicians coupled with appropriate and timely treatment with regular follow up is required. Chromobacterium violaceum inhabits the tropical and subtropical regions; however changing climates attributed to global warming may further increase the number of infections. We report a case of an eleven year old boy presenting with Fournier's gangrene caused due to Chromobacterium violaceum. Prompt treatment and appropriate management with follow up was done.

Introduction

CHROMOBACTERIUM VIOLACEUM is an aerobic, gram-negative bacillus usually found as a saprophyte in soil and water in tropical and subtropical regions (Steinberg & Del Rio, 2010). *C. violaceum* was first identified in 1881; its pathogenic potential was first described by Wooley in 1905, who isolated it from a fatal infection in a buffalo (Wooley, 1905) and the first case in humans was reported from Malaysia in 1927 (Sneath, Singh, Whelan, & Edwards, 1953).

Despite the ubiquitous distribution, human infection with this organism is rare, and the awareness of the infections associated with this organism is limited. Human infection with this organism results in systemic and severe disease with a high fatality rate(Steinberg & Del Rio, 2010) (Steinberg and Del Rio, 2010). Most of the cases reported involved healthy and young individuals. History of trauma, exposure to water or soil, or both often predisposes the infection(Yang & Li, 2011)(Yang and Li, 2011) easily distantant metastasis, multidrug-resistance, and frequent relapse, and high mortality rate.\n\nMETHODS: The English-language literature was reviewed from 1952 through December 2009 by an electronic view via the PubMed and Medline databases and manual searches.\n\nRESULTS: One hundred and six patients with Chrombacterium violaceum infection from the literature were studied. The four leading clinical manifestations reviewed in the published literature, in the order of frequency, were fever (100%. Also, relapses are not uncommon (Kaufman, Ceraso, & Schugurensky, 1986; Yang & Li, 2011)(Kaufman et al., 1986; Yang and Li, 2011)easily distantant metastasis, multidrug-resistance, and frequent relapse, and high mortality rate.\n\nMETHODS: The English-language literature was reviewed from 1952 through December 2009 by an electronic view via the PubMed and Medline databases and manual searches.\n\nRESULTS: One hundred and six patients with Chrombacterium violaceum infection from the literature were studied. The four leading clinical manifestations reviewed in the published literature, in the order of frequency, were fever (100%.

We present the first case of *Chromobacterium violaceum* infection from North East India.

Case Report

An eleven year old boy was brought to the hospital with history of pain and swelling in scrotum and penile region, and fever for 6 days. Previously, the child had a furuncle in the scrotum. He punctured and applied toothpaste over it. The next day, pustular lesions appeared in the scrotal and penile area which was associated with pain. Subsequently, the child developed high fever.

The child was previously admitted to a local hospital and treated with parenteral analgesics, antipyretics and antibiotics. His condition did not improve and deteriorated within 2 days. He was then referred to tertiary care hospital for further management.

On examination, the child was conscious, oriented and in severe pain. There was no pallor or icterus. Local examination showed swelling, sloughing and ulceration with multiple discharging sinuses in skin over scrotum and penis; external genitalia were oedematous, ulcerative and gangrenous (Figure 1). Bilateral inguinal lymph nodes were enlarged. Systemic examination showed no abnormalities.

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Figure 1 showing sloughing and ulceration of skin over scrotum and penis

A diagnosis of Fournier's gangrene was made. Emergency debridement and suprapubic cystostomy was performed under piperacillin-tazobactam and metronidazole coverage. Post op period was uneventful and the antibiotics were continued. Routine and bacteriological investigations were carried out. Pus and debrided tissue were sent to microbiology department for bacterial culture.

Gram stain of the discharge from the wound showed plenty of pus cells along with gram-negative pleomorphic rods. The sample was inoculated on blood agar and MacConkey agar and incubated aerobically at 37^0C for 24 hours. The next day smooth, round, convex, violet coloured colonies were noticed on both plates. On blood agar, deep violet colonies with beta-hemolysis was seen (Figure 2 & Figure 3). The biochemical characteristics of the isolated strain are shown (Table 1). Disk diffusion susceptibility tests (Kirby-Bauer's technique) showed the organism susceptible to ciprofloxacin, ofloxacin, amikacin, gentamicin, piperacillin, chloramphenicol, imipenem, meropenem, cefoperazone and ceftriaxone. It was resistant to ampicillin.

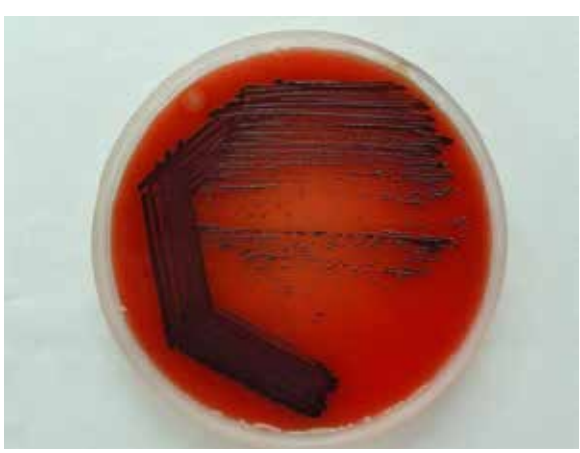

Figure 2 showing deep violet colonies in blood agar

Figure 3 showing beta hemolysis around deep violet colonies in blood agar

S.No	Test performed	Inference
1.	Catalase test	Positive
2.	Oxidase test	Positive
3.	Motility	Motile
4.	Nitrate reduction test	Positive
5.	Arginine dehydrolase	Positive
6.	Gelatin hydrolysis	Positive
7.	Esculin hydrolysis	Negative
8.	Simmon's citrate test	Negative
9.	Ornithine decarboxylase test	Negative
10.	Lysine decarboxylase test	Negative
11.	Indole test	Variable
12.	Urease test	Negative
13.	Acid from glucose	Positive
14.	Acid from sucrose	Variable
15.	Acid from lactose	Negative
16.	Acid from xylose	Negative
17.	Acid from mannitol	Negative
18.	Acid from mannose	Positive
19.	Acid from trehalose	Positive
20.	Acid from fructose	Positive
21.	Acid from maltose	Variable
22.	Hemolysis	-Hemolysis
23.	Arabinose fermentation test	Negative
24.	Methyl red test	Positive
25.	Oxidation fermentation test	Positive
26.	O-nitrophenyl-β-D-galactopyranoside hydrolysis	Negative

The patient was followed up for 20 days with the same antibiotics and daily wound dressing was done. The wound healed completely with no signs of recurrence or septicaemia. Skin grafting was successfully done for the patient (Figure 4).

Figure 4 After 20 days of treatment and skin grafting

Discussion

Human infections with this organism are rare. Fewer than 200 cases have been reported worldwide with most recent reports from Southeast Asia(Steinberg & Del Rio, 2010). A failure to recognise the organism, (A) especially its non-pigmented variant, (B) or the dismissal of the organism as contaminant may explain this. Biochemical similarity to *Pseudomonas* and *Aeromonas* species is another confounding factor(Kaufman et al., 1986) (Kaufman et al., 1986). Though the organism is confined to a narrow geographic range between latitudes 35^0 N and 35^0 S, the effects of the global warming may further change the geographic distribution of this organism in the future (Yang & Li, 2011).

Infection in humans usually follows a break in the skin and contamination with water (stagnant) or soil. Symptoms include pain at a local site of infection, fever, nausea, vomiting, abdominal pain, and diarrhoea. Local cellulitis, pustules, ulcers with necrotic base, or lymphadenitis commonly precedes evidence of systemic infection (Steinberg & Del Rio, 2010)(Steinberg and Del Rio, 2010). Septic shock develops rapidly, as can pneumonia and visceral abscesses involving the liver, spleen, and lung. Urinary tract infection, conjunctivitis, orbital cellulitis, retropharyngeal infection with prevertebral abscess, neutropenic sepsis, osteomyelitis, brain abscess, meningitis, and puerperal sepsis have been reported(Moore, Lane, & Stephens, 2001). Sepsis with this organism is often found with concomitant immune deficits, most frequently chronic granulomatous disease (CGD) (Macher, 1982) (MACHER, 1982). Mortality rates for the reported cases is about 53%(Yang & Li, 2011).

The case under study presented with skin lesions and fever associated with lymphadenopathy which are commonly associated with *Chromobacterium violaceum* infection as reported by Yang and Li (Yang & Li, 2011). He also had a history of frequent swimming in a local pond. The patient had deteriorated before admission. Significant improvement was observed when piperacillin-tazobactam was administered. The isolate was sensitive to ciprofloxacin, ofloxacin, amikacin, gentamicin, piperacillin, chloramphenicol, imipenem, meropenem, cefoperazone and ceftriaxone but resistant to ampicillin which is consistent with the extensive in vitro studies of Aldridge et al (Aldridge, Valainis, & Sanders, 1988).

Our patient survived a usually fatal infection after being treated with antibiotic regimen that included piperacillin. Since relapses are quite common (Kaufman et al., 1986; Yang & Li, 2011), the patient was followed up for two months. He showed significant improvement.

Quick diagnosis, accurate bacterial identification, and specific treatment are very important, because *Chromobacterium violaceum* may cause serious infection in healthy and young people (Yang & Li, 2011)easily distantant metastasis, multidrug-resistance, and frequent relapse, and high mortality rate.\n\nMETHODS: The English-language literature was reviewed from 1952 through December 2009 by an electronic view via the PubMed and Medline databases and manual searches.\n\nRESULTS: One hundred and six patients with Chrombacterium violaceum infection from the literature were studied. The four leading clinical manifestations reviewed in the published literature, in the order of frequency, were fever (100%. It is important for physicians in tropical and subtropical regions to consider this infection as part of differential diagnosis of sepsis with gram- negative rod bacteremia, especially with a history of exposure to stagnant water.

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